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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/671,120	09/28/2000	Eiichi Takahashi	21.1980/CJG	8624

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EXAMINER	
SHARON, AYAL I	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/671,120	TAKAHASHI ET AL.	
	Examiner	Art Unit	
	Ayal I Sharon	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 12-15* is/are rejected.

7)☒ Claim(s) *8-11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 September 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-14 of U.S. Application 09/671,120 filed on 09/28/2000 are presented for examination. The application claims foreign priority to Japanese application 11-279516, filed on 09/30/1999. In the amendment filed 8/24/2004, Applicants have amended claims 1 and 8-14, and added new claim 15.

Claim Objections

2. Claims 8-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. The prior art used for these rejections is as follows:

5. Caswell et al. U.S. Patent 6,336,138. (Henceforth referred to as "**Caswell**").

6. **Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by Caswell.**

7. In regards to Claim 1, Caswell teaches the following limitations:

1. A service distribution device for distributing services among a plurality of servers on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network;
(Caswell, especially: Col.6, lines 35-60. "By processing the headers of packets, a software probe can deduce many of the relationships that exist between servers.")

a server identifier recording information pertaining to the captured packets into a server log for each server;
(Caswell, especially: Col.6, lines 35-60. "The second basic approach is to use special-purpose discovery agents that are installed on the ISP hosts to discover relationships among services.")

a service identifier recording information pertaining to the captured packets into a service log for each service;
(Caswell, especially: Col.6, lines 10-35. "In Fig.2, the instance 36 is determined using auto-discovery, as will be explained fully below. Information regarding the services and service elements (e.g., servers, hosts and links) that exist in the ISP system or other service provider systems may be auto-discovered.")

a server modeling module setting up a simulation model for each server from the server log;
(Caswell, especially: Col.6, lines 35-60. "The second basic approach is to use special-purpose discovery agents that are installed on the ISP hosts to discover relationships among services.")

a service modeling module setting up a simulation model for each service from the service log;
(Caswell, especially: Col.6, lines 10-35. "In database terminology, the service model template 34 is the schema. On the other hand, an instance defines the records in the database and the values of the static information. In Fig.2, the instance 36 is determined using auto-discovery, as will be explained fully below. Information regarding the services and service elements (e.g., servers, hosts and links) that exist in the ISP system or other service provider systems may be auto-discovered.")

a simulator reading in the server model and the service model and running each simulation; and

(Caswell, especially: col.6, line 60 to col.7, line 13)

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result.

(Caswell, especially: col.6, line 60 to col.7, line 13. "The round-robin scheduling balances the load among the servers.")

8. In regards to Claim 2, Caswell teaches the following limitations:

2. The service distribution device of claim 1, further comprising a packet relay device obtaining packets using a packet capture module mounted on said packet relay device, which relays packets between a client and the servers.

(Caswell, especially: Col.6, lines 35-60. "By processing the headers of packets, a software probe can deduce many of the relationships that exist between servers.")

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The prior art used for these rejections is as follows:

11. Caswell et al. U.S. Patent 6,336,138. (Henceforth referred to as "**Caswell**").

12. Zhu, H. "Adaptive Load Sharing for Clustered Digital Library Services". The 7th Int'l Symposium on High Performance Computing. July 31, 1998. pp. 235-242. (Henceforth referred to as "**Zhu**").

13. Abbott et al., U.S. Patent 6,314,463. (Henceforth referred to as "**Abbott**").

14. Kleinrock, L. "On the Modeling and Analysis of Computer Networks." Proc. of the IEEE. Aug.1993. pp.1179-1191. (Henceforth referred to as "**Kleinrock**").

15. Microsoft Press Computer User's Dictrionary. © 1998. p.344. (Henceforth referred to as "**Microsoft**").

16. Jain, R. The Art of Computer Systems Performance Analysis. © 1991. pp.624-626. Specifically, the section titled "Symbols Frequently Used in Queueing Analysis." (Henceforth referred to as "**Jain**").

17. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

18. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caswell in view of Microsoft and further in view of Abbott.

19. In regards to Claim 3, Caswell does not expressly teach the following limitations:

> 3. The service distribution device of claim 1,
>
> wherein said server modeling module constructs a server model having a queue corresponding to a transmission process using the server log and a server transmission throughput, a server processing time, and a unit processing time as parameters,
>
> wherein the server transmission throughput is calculated from a total size L of an arbitrary, continuous string of the continuously transmitted packets using the formula L / (t-e - t-s) where t-a is an ending packet capture time and t-s is a starting packet capture time, and
>
> wherein the server processing time is calculated using the formula (ts - tc) - (ls + lc) / B, wherein ts and ls are the capture time and size of a server response packet, respectively, tc and lc are the capture time and size of a corresponding client response packet, respectively, and B is a network speed.

Microsoft, on the other hand, teaches that "throughput" is a "... measure of ... the data processing rate in a computer system." By definition, this measurement of (quantity of data / period of time).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of

Microsoft, because the Microsoft dictionary teachings were well known in the art at the time the invention as made.

Abbott teaches (see Fig.5) that order to calculate the response time, it is not sufficient to subtract the "request sent" time stamp (at the client) from the "end of processing" time stamp (at the server). The queue delay must also be included in the calculations. Inherently, the queue delay also applies to when the server sends the processing results to the client.

This corresponds to Applicant's claimed formula. The formula component "(ts – tc)" corresponds to subtracting the "request sent" time stamp (at the client) from the "end of processing" time stamp (at the server). The queue delay (network delay) corresponds to the formula component "(ls + lc) / B".

It would have been obvious to one of ordinary skill in the art to modify the teachings of Caswell with those of Abbott, because Abbott's tools help to "coordinate the operation of multiple web servers." (Abbott, Abstract).

20. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caswell in view of Jain and further in view of Kleinrock.

21. In regards to Claim 4, Caswell does not expressly teach the following limitations:

4. The server distribution device of claim 1, wherein said service modeling module calculates the following parameters from the service log by constructing a service model for each service:

a ratio of the number of sessions for each service to the number of sessions for all services,

a session starting frequency or time interval,

a number of transmissions between the client and server per session,

a client response size, packet size, and packet count per transmission,

a server response size, packet size, and packet count per transmission, and

a time from the server response until the client response.

Jain, on the other hand, teaches the following parameters which correspond to those claimed by the Applicants:

- The ratio of the parameters D_i and D, (Total service demand on server 'i', and Total service demand on all servers), as taught by Jain, produces a ratio that corresponds to Applicants' claimed limitation:

  a ratio of the number of sessions for each service to the number of sessions for all services,

- The parameter τ, (Inter-arrival time), as taught by Jain, corresponds to Applicant's claimed limitation:

  a session starting frequency or time interval,

- The parameter V_i, (Number of visits to service center i), as taught by Jain, corresponds to Applicant's claimed limitation:

  a number of transmissions between the client and server per session,

- The parameter I, (Idle time duration for a server), as taught by Jain, corresponds to Applicant's claimed limitation:

  a time from the server response until the client response.

It would have been obvious to one of ordinary skill in the art to modify the teachings of Caswell with those of Jain, because Jain's symbols are "Frequently Used in Queueing Analysis".

Kleinrock teaches the following parameters which correspond to those claimed by the Applicants:

a client response size, packet size, and packet count per transmission,

a server response size, packet size, and packet count per transmission, and

Kleinrock teaches (p.1180, col.2, para.3) that "The modification is to assume that message lengths are all the same (rather than the exponential assumption above), and that the topology is a tandem network.

It would have obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Kleinrock, Because Caswell expressly teaches (col.5, lines 27-32) that "Both the server parameters and required service characteristics are inputs to modeling process such as is described in [two other Kleinrock references related to modeling queuing computer networks]."

22. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caswell in view of Kleinrock.

23. In regards to Claim 5, Caswell does not expressly teach the following:

5. The service distribution device of claim 1, wherein said simulator performs a simulation using the server model and the service model and generates a mean value or a median value of a session time for the specific service.

Kleinrock, on the other hand, does expressly teach:

a) generating the mean delay time of a system "One of the first general results was an exact expression for the mean delay experienced by a message as it passed through a network ..." (See p.1179, col.2, paragraph 4).

b) generating the mean response time of a system "In addition, we let Ti be the mean response time of this little queueing system." (See p.1180, col.2, Eq.4)

It would have obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Kleinrock, Because Caswell expressly teaches (col.5, lines 27-32) that "Both the server parameters and required service characteristics are inputs to modeling process such as is described in [two other Kleinrock references related to modeling queuing computer networks]."

24. Claims 6-7, and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caswell in view of Zhu.

25. In regards to Claim 6, while Caswell teaches a "... round-robin scheduling balances the load among the servers" (Caswell: col.7, lines 8-9), Caswell does not expressly teach the following:

6. The service distribution device of claim 1, wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a predetermined threshold.

Zhu does teach these limitations (see Section 3.2, "Policies for Node Selection and Load Collection").

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Zhu, because doing so enables "... each processor to make a decision in a distributed manner and choose the best server node for redirection ..." (Zhu, Section 3.2, first paragraph).

26. In regards to Claim 7, while Caswell teaches a "... round-robin scheduling balances the load among the servers" (Caswell: col.7, lines 8-9), Caswell does not expressly teach the following:

7. The service distribution device of claim 6, wherein when said server selection module receives a server distribution query, said server selection module sets a server permission to be a starting frequency of the session that will cause a high load state for the service in question for each server, and specifies a server having the biggest difference between the session starting frequency and the permission as a server for distribution.

Zhu does teach these limitations (see Section 3.2, "Policies for Node Selection and Load Collection").

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Zhu, because doing so enables "... each processor to make a decision in a distributed manner and choose the best server node for redirection ..." (Zhu, Section 3.2, first paragraph).

27. In regards to Claim 12, Caswell teaches the following limitations:

12. A service distribution device for distributing services among a plurality of servers to balance server loads, comprising:

a server modeling module generating a simulation model for each server and a service modeling module generating a simulation model for each service based on a server log and a service log of captured server communications;

(Caswell, especially: Col.6, lines 35 to col.7, line 13)

Examiner interprets that the "one approach", using "network probes" inherently requires some sort of service log in order to keep track of, and eventually "... deduce the many of the relationships that exist among servers."

The "second basic approach", uses "special-purpose discovery agents" installed on "ISP hosts" in order to "... discover relationships among services". Examiner interprets that the "ISP hosts" in the "second basic approach" correspond to servers, and that the use of "special-purpose discovery agents" installed on "ISP hosts" inherently requires some sort of server log in order to keep track of, and eventually deduce, "... discover relationships among services".

a simulator reading the server models and the service models and running a plurality of simulations; and

(Caswell, especially: Col.6, lines 35 to col.7, line 13. "A second phase of the auto-discovery process uses software agents that are executed within the ISP system and that take an internal viewpoint of the ISP system.")

While Caswell teaches a "... round-robin scheduling balances the load among the servers" (Caswell: col.7, lines 8-9), Caswell does not expressly teach the following:

a server selection module determining which servers have low loads based on results of the simulations and selecting the servers with low loads to receive the services.

Zhu does teach these limitations (see Section 3.2, "Policies for Node Selection and Load Collection").

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Zhu, because doing so enables "... each processor to make a decision in a distributed manner and choose the best server node for redirection ..." (Zhu, Section 3.2, first paragraph).

28. In regards to Claim 13, Caswell teaches the following limitations:

13. A method for distributing services among a plurality of servers to balance server loads, comprising:

generating a simulation model for each server and each service based on a server log and a service log of captured server communications;

(Caswell, especially: Col.6, lines 35 to col.7, line 13)

Examiner interprets that the "one approach", using "network probes" inherently requires some sort of service log in order to keep track of, and eventually "... deduce the many of the relationships that exist among servers."

The "second basic approach", uses "special-purpose discovery agents" installed on "ISP hosts" in order to "... discover relationships among services".

Examiner interprets that the "ISP hosts" in the "second basic approach" correspond to servers, and that the use of "special-purpose discovery agents" installed on "ISP hosts" inherently requires some sort of server log in order to keep track of, and eventually deduce, "... discover relationships among services".

running a plurality of simulations using the server and service models; and
(Caswell, especially: Col.6, lines 35 to col.7, line 13. "A second phase of the auto-discovery process uses software agents that are executed within the ISP system and that take an internal viewpoint of the ISP system.")

While Caswell teaches a "... round-robin scheduling balances the load among the servers" (Caswell: col.7, lines 8-9), Caswell does not expressly teach the following:

determining which servers have low loads based on results of the simulations

and selecting the servers with low loads to receive the services.

Zhu does teach these limitations (see Section 3.2, "Policies for Node Selection and Load Collection").

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Zhu, because doing so enables "... each processor to make a decision in a distributed manner and choose the best server node for redirection ..." (Zhu, Section 3.2, first paragraph).

29. In regards to Claim 14, Caswell teaches the following limitations:

14. A computer-readable storage controlling a computer and comprising a process of:

generating a simulation model for each server and each service based on a server log and a service log of captured server communications;
(Caswell, especially: Col.6, lines 35 to col.7, line 13)

Examiner interprets that the "one approach", using "network probes" inherently requires some sort of service log in order to keep track of, and eventually "... deduce the many of the relationships that exist among servers."

The "second basic approach", uses "special-purpose discovery agents" installed on "ISP hosts" in order to "... discover relationships among services". Examiner interprets that the "ISP hosts" in the "second basic approach" correspond to servers, and that the use of "special-purpose discovery agents" installed on "ISP hosts" inherently requires some sort of server log in order to keep track of, and eventually deduce, "... discover relationships among services".

running a plurality of simulations using the server and service models; and

(Caswell, especially: Col.6, lines 35 to col.7, line 13. "A second phase of the auto-discovery process uses software agents that are executed within the ISP system and that take an internal viewpoint of the ISP system.")

While Caswell teaches a "... round-robin scheduling balances the load among the servers" (Caswell: col.7, lines 8-9), Caswell does not expressly teach the following:

determining which servers have low loads based on results of the simulations

and selecting the servers with low loads to receive the services.

Zhu does teach these limitations (see Section 3.2, "Policies for Node Selection and Load Collection").

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Zhu, because doing so enables "... each processor to make a decision in a distributed manner and choose the best server node for redirection ..." (Zhu, Section 3.2, first paragraph).

30. In regards to Claim 15, Caswell teaches the following limitations:

15. (new) A method for distributing services among a plurality of servers, comprising:

capturing network communication of at least one of the servers;

(Caswell, especially: Col.6, lines 35-60. "By processing the headers of packets, a software probe can deduce many of the relationships that exist between servers.")

adding information about the captured network communication to a log;
(Caswell, especially: Col.6, lines 35 to col.7, line 13)

Examiner interprets that the "one approach", using "network probes" inherently requires some sort of service log in order to keep track of, and eventually "... deduce the many of the relationships that exist among servers."

The "second basic approach", uses "special-purpose discovery agents" installed on "ISP hosts" in order to "... discover relationships among services". Examiner interprets that the "ISP hosts" in the "second basic approach" correspond to servers, and that the use of "special-purpose discovery agents" installed on "ISP hosts" inherently requires some sort of server log in order to keep track of, and eventually deduce, "... discover relationships among services".

While Caswell teaches a "... round-robin scheduling balances the load among the servers" (Caswell: col.7, lines 8-9), Caswell does not expressly teach the following:

simulating the servers based on the log;

determining at least one of the servers having a low load based on the simulating; and

distributing a service to the determined at least one of the servers.

Zhu does teach these limitations (see Section 3.2, "Policies for Node Selection and Load Collection").

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Caswell with those of Zhu, because doing so enables "... each processor to make a decision in a distributed manner and choose the best server node for redirection ..." (Zhu, Section 3.2, first paragraph).

Response to Amendment

Re: Claim Rejections - 35 USC § 112

31. Applicants have amended claims 8 and 9 to provide definitions for the β and γ parameters in the claims. Examiner has found support in the specification (p.19) for these amendments. The rejections of claims 8 and 9 based on 35 USC § 112 have been withdrawn.

32. Applicants have amended claim 10 to clarify the differences between the two different types of "responses" cited in the claim. Examiner has found support in the specification (pp.10-11) for these amendments. The rejection of claim 10 based on 35 USC § 112 has been withdrawn.

33. Applicants have amended claim 11, by inserting a comma, in order to clarify the ambiguity in the claim. The rejection of claim 11 based on 35 USC § 112 has been withdrawn.

Re: Claim Rejections - 35 USC § 102

34. Examiner has found applicants' arguments regarding the Pitkin reference to be persuasive, and has withdrawn the reference.

35. Moreover, Applicants have amended claims 1 and 8-14, and have added new claim 15.

Conclusion

36. Applicant's arguments filed 8/24/2004 have been fully considered but they are not persuasive.

37. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (703) 306-0297. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on (703) 305-9704. Any response to this office action should be mailed to:

Director of Patents and Trademarks
Washington, DC 20231

Hand-delivered responses should be brought to the following office:

4th floor receptionist's office
Crystal Park 2
2121 Crystal Drive
Arlington, VA

The fax phone number is: (703) 872-9306

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is: (703) 305-3900.

Ayal I. Sharon

Art Unit 2123

November 22, 2004